

SUITABILITY OF MISSOURI SOILS FOR IRRIGATION

Knowledge of soils is essential to properly plan an irrigation system. Missouri has a wide variety of soils with a broad range of characteristics that should be considered when irrigating. The more important characteristics to consider are: available water capacity, permeability, land slope, and wetness. Specific soil limitations must also be considered for some soils.

This supplement rates most Missouri soils used primarily for cropland and likely to be considered for irrigation. Only those soils on slopes less than 9 percent were considered. This information was prepared to help those working with Missouri irrigators by providing general planning criteria.

Each soil is given a suitability rating for surface and sprinkler irrigation. The ratings were prepared by evaluating the soil characteristics, soil limitations, and ways to overcome the limitations.

The following describes a soil which would have the best suitability rating for irrigation: 1) productive; 2) has an intake rate suitable to the type of irrigation system; 3) has the capacity to store enough water to meet the needs of the crop between water applications; 4) is not subject to excessive flooding; 5) is not too steep; and 6) is deep enough to provide an adequate root zone and allow any necessary land leveling.

The ratings assume all soil limitations are considered in the design of the system and all recommendations are followed. The recommendations concern the need for surface and subsurface drainage and control of wind and water erosion. All of these factors must be considered to complement a successful irrigation system.

All recommendations shown in this guide may not always apply for all local conditions. Commonly used local practices should be used where they have proven effective.

In Missouri it is possible to have a heavy rainfall immediately after an irrigation period. Therefore, an adequate surface drainage system is necessary to prevent damage to crops. Also, many soils may have a seasonally high water table that may limit root development. Subsurface drainage systems may be needed to provide adequate internal drainage. Refer to MO-14-10 thru 26 for information concerning drainage needs of the various soils.

The soil type for any given tract of land can be determined from public county soil survey reports, from individual conservation plans, or from unpublished soil maps. Soil maps are made at relatively small scales so some smaller inclusions of different soils may not be drawn on the map. Therefore, the information in this supplement should be used in conjunction with an onsite review and detailed investigations if needed.

The following tables are an alphabetical listing of Missouri soils that might be considered for irrigation, along with data and suitability ratings that may be used for planning and design of the irrigation systems.

The following is an explanation of the terms used in the tables.

Surface Texture: Each soil type may have more than one texture in the surface layer. The following abbreviations are used according to the USDA classification system to describe the surface texture of each soil:

C	Clay	Muck	Muck
CL	Clay Loam	S	Sand
CR	Cherty	SCL	Sandy Clay Loam
FS	Fine Sand	SIC	Silty Clay
FSL	Fine Sandy Loam	SICL	Silty Clay Loam
GR	Gravelly	SIL	Silt Loam
L	Loam	SL	Sandy Loam
LS	Loamy Sand	VFS	Very Fine Sand
LFS	Loamy Fine Sand	VFSL	Very Fine Sandy Loam

Land Slope: Land slope refers to the steepness of the ground surface. Slope is expressed in percent. It is the difference in elevation in feet for each 100-feet horizontal. The following ranges of slopes may be given for each soil type: A (0-2%), B (2-5%), C (5-9%).

Available Water Capacity: The available water capacity of a soil is the amount of moisture available for plant growth. It is the amount of water held between field capacity and the permanent wilting point. Field capacity is the amount of water retained in the soil after the free water has drained out. At the wilting point, the moisture content of the soil is so low that the plant can no longer withdraw water and wilting occurs. Available water is expressed in inches of water per inch of soil depth. The available water capacity of a soil is primarily related to soil texture and density. The accumulated available water content for each one-foot interval of the soil profile is shown for each soil type. For most soils, irrigation should be started when the existing soil moisture content within the root zone is about 50 percent of the total available moisture capacity shown. Local practices and conditions may indicate a need to begin irrigation before the 50 percent moisture depletion level.

Soil Limitations: Each soil may have characteristics that will greatly influence crop performance and irrigation management. The limitations are designated in the tables by small letters. Refer to the page opposite each table for a description of the limitations noted for each soil. Most of the soils with limitations will require a higher degree of management to successfully irrigate crops.

Recommendations: Some soils will need protection from wind and water erosion, or improved surface and subsurface drainage. The recommendations are

designated in the tables by numbers. Refer to the page opposite each table for a description of the recommendations noted for each soil.

Suitability Ratings: Each soil type is rated for its suitability for surface and sprinkler irrigation. The ratings were prepared by evaluating the following soil characteristics and limitations: land slope, available water capacity, intake rate, depth to fragipan or rock, and tendency of the surface layer to crack prior to irrigation. The ratings assume all recommendations are followed.

Good - Soils that should have no restrictions to irrigation using proper water application rates, amounts, and scheduling.

Fair - Soils that have limitations due to permeability, land slope, available water content or tendency for surface cracking. Most of the restrictions can be overcome by proper design of the system and a higher degree of management. Irrigation of many of these soils may result in a significant increase in yields, which may make them more economically feasible for irrigation than many of the soils rated "good".

Poor - Soil that have severe restrictions to irrigation and should only be irrigated as minor inclusions with other irrigable soils.

Maximum Sprinkler Application Rates: The maximum application rate is the rate that water can be applied without excessive runoff. It is a measure of the soil's capacity to absorb irrigation water from the surface and transmit it through the soil profile. The soil absorbs water rapidly when it is first applied to the field surface. As the irrigation application continues, the surface soil gradually becomes saturated and the intake decreases until it reaches a nearly constant value.

The initial intake rate is greatly influenced by the presence of cracks, crop residue, and cavities created by tillage. Organic matter content, plant cover, degree of surface drainage, and use of conservation practices also affect the rate of infiltration.

Where no values are shown, it is because (1) the saturated permeability rate of the most restrictive layer is less than 0.1 inch per hour or (2) the net application is greater than one-half of the available water capacity of the top 48 inches of the soil profile.

Pressure and sprinkler nozzles should be selected to supply water to the soil at a rate no greater than the maximum rate shown for the net application amount to be applied (Note: gross application amount = net application amount ÷ design efficiency). In this way, surface runoff and loss of top soil and fertility can be avoided, as well as wasted water and higher pumping costs.

LAND SLOPE

A: (02%) B: (2-5%) C: (5-9%)

SOIL LIMITATIONS

- a. A clayey subsoil layer with slow or very slow permeability restricts the downward movement of water within the root zone of most plants.
- b. Highly alkaline subsoil will greatly reduce crop production if exposed. This may limit depth of cut in land leveling.
- c. Limestone or shale within the top 48 inches of the soil profile may interfere with grade and alignment of underground conduits.
- d. Subsoil may contain pockets of sand which may limit depth of cut in land leveling or may give uneven distribution of surface irrigation water.
- e. Fragipan in top 30 inches of the soil profile will limit root development of most crops.
- f. A seasonally high water table may restrict root development of most crops.
- g. The soil surface layer has a tendency to crack prior to irrigation. Net intake is obtained in a relatively short time and very little additional intake occurs after the cracks seal.
- h. An onsite evaluation is needed to determine the frequency and severity of flooding. If flooding is common during the growing season, irrigation suitability will be "poor" unless protection is provided.

RECOMMENDATIONS

1. Land leveling and/or shallow field ditches may be needed to improve surface drainage. Cross-slope drains should be used on gently sloping areas.
2. Conservation cropping systems including residue management may be needed to control wind erosion.
3. Terraces, conservation tillage, and other conservation practices may be needed to control water erosion.
4. See MO-14-10 thru 26 for drainage recommendations and limitations.
5. Supplemental irrigation may not be needed during most years.

Soil Name & Surface Texture	Land Slope*	Cumulative Available Water Capacity (in.)				Soil Limits*	Recommendations*	Suitability**		Maximum Sprinkler Application Rate (in./hr.)	
		1	2	3	4			Surface Irrig.	Sprinkler Irrig.	Net Application (in.)	0.5
ADAIR L	B,C	2.5	4.6	6.3	8.1	a,f	3,4	Poor	Fair	2.1	1.4
ADAIR CL	C	2.2	4.0	5.7	7.5	a,f	3,4	Poor	Fair	0.9	1.0
AHOLT C	A	1.4	2.9	4.3	5.8	a,f,g,h	1,4	Fair	Poor	---	0.4
ALBATON SIC, C	A	1.4	2.9	4.3	5.8	a,f,g,h	1,4	Fair	Poor	0.3	0.2
ALSUP SIL	B,C	2.0	3.7	5.2	6.3	c	3	Poor	Fair	2.3	1.5
ALVIN FSL	C	2.0	4.0	5.9	8.4		2,3	Poor	Fair	5.7	3.8
ARBELA SIL	A	2.5	5.0	7.3	9.6	f,h	1,4,5	Fair	Fair	2.2	1.5
ARMSTER L	C	2.0	3.6	5.3	7.0	a,f	3	Poor	Fair	2.3	1.5
ARMSTRONG CL	C	2.4	4.0	5.7	7.5		3,4	Poor	Poor	0.6	0.4
ARMSTRONG L	C	2.4	4.0	5.7	7.5	a,f	3,4	Poor	Fair	2.2	1.4
ASHTON SIL	A	2.3	4.7	7.1	9.4		5	Good	Good	2.6	1.6
ASHTON SIL	B	2.3	4.7	7.1	9.4		3,5	Fair	Fair	2.6	1.6
AUXVASSE SIL	A	2.8	4.7	6.4	8.7	a,f	1,4	Fair	Fair	2.7	1.7
BADO SIL	A	2.8	4.1	5.1	5.9	e,f	1,4	Fair	Fair	0.7	0.5
BARCO SIL, FSL	B	2.0	3.7	5.1		c	2,3	Poor	Fair	5.7	3.8
BARCO L	B	2.3	4.0	5.4		c	3	Poor	Fair	5.3	3.6
BARCO L	C	2.3	4.0	5.4		c	3	Poor	Fair	5.3	3.6
BARDEN SIL	A,B	2.6	4.7	6.3	7.7	a,f	3	Good	Good	2.4	1.5
BATES FSL	B	1.9	3.9	5.5		c	3	Poor	Fair	4.9	3.4
BEAUCOUP SICL	A	2.6	5.0	7.3	9.6	f,h	1,4,5	Fair	Fair	1.0	0.6
BELKNAP SIL	A	2.8	5.3	7.8	10.3	f,h	1,4,5	Good	Good	2.1	1.3
BLACKOAR SIL	A	2.6	5.3	7.9	10.6	f,h	1,4,5	Good	Good	2.3	1.5
BLAKE SICL	A	2.4	4.8	7.2	9.6	f,h	1,4,5	Good	Good	3.8	2.2
BLOOMSDALE SIL	A	2.6	4.8	5.9	6.7	h	1	Good	Good	2.7	1.7

MO-15-5

*See opposite page for description.

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LAND SLOPE

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SOIL LIMITATIONS

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- b. Highly alkaline subsoil will greatly reduce crop production if exposed. This may limit depth of cut in land leveling.
- c. Limestone or shale within the top 48 inches of the soil profile may interfere with grade and alignment of underground conduits.
- d. Subsoil may contain pockets of sand which may limit depth of cut in land leveling or may give uneven distribution of surface irrigation water.
- e. Fragipan in top 30 inches of the soil profile will limit root development of most crops.
- f. A seasonally high water table may restrict root development of most crops.
- g. The soil surface layer has a tendency to crack prior to irrigation. Net intake is obtained in a relatively short time and very little additional intake occurs after the cracks seal.
- h. An onsite evaluation is needed to determine the frequency and severity of flooding. If flooding is common during the growing season, irrigation suitability will be "poor" unless protection is provided.

RECOMMENDATIONS

- 1. Land leveling and/or shallow field ditches may be needed to improve surface drainage. Cross-slope drains should be used on gently sloping areas.
- 2. Conservation cropping systems including residue management may be needed to control wind erosion.
- 3. Terraces, conservation tillage, and other conservation practices may be needed to control water erosion.
- 4. See MO-14-10 thru 26 for drainage recommendations and limitations.
- 5. Supplemental irrigation may not be needed during most years.

Soil Name & Surface Texture	Land Slope*	Cumulative Available Water Capacity (in.)				Soil Limits*	Recommendations*	Suitability**		Application Rate (in./hr.)		
		1	2	3	4			Surface Irrig.	Sprinkler Irrig.	Net Application (in.)	0.5	1.0
BLENCOE SIC	A	1.6	3.1	5.5	8.0	a,f,g	1,4	Fair	Poor	0.2	0.1	0.1
BOLIVAR FSL	B,C	2.0	3.6	4.1	c	2,3	Poor	Fair	Fair	5.4	3.7	2.9
BOLIVAR L	C	2.3	3.9	4.4	c	3	Poor	Fair	Fair	1.6	1.1	0.9
BOOKER SIC, C	A	1.6	3.0	4.2	5.4	a,f,g,h	1,4	Fair	Poor	---	---	---
BOSWORTH C	A	1.7	3.3	4.8	6.4	a,f,g,h	1,4	Fair	Poor	0.2	---	---
BREMER SIL, SICL	A	2.6	5.0	6.9	9.0	f,h	1,4,5	Fair	Fair	3.7	2.2	1.4
BRITWATER GR-SIL	A	1.7	3.2	4.4	5.6	c	3	Fair	Fair	2.1	1.4	1.0
BUCKLICK SIL, SICL	B,C	1.9	3.7	5.5	7.0	a,f	3,4	Poor	Fair	3.5	2.1	1.3
CALWOODS SIL	B	2.6	4.0	5.6	7.5	a,f,g,h	1,4	Fair	Fair	2.3	1.5	1.1
CAPTINA SIL	A,B	2.4	4.7	5.3	5.9	e,f	3,4	Fair	Fair	2.3	1.5	1.1
CAPTINA SIL	C	2.4	4.7	5.3	5.9	e,f	3,4	Poor	Fair	2.3	1.5	1.1
CARLOW SIC, C	A	1.6	2.8	4.0	5.2	a,f,g,h	1,4	Fair	Poor	0.2	---	---
CARR FSL	A	2.0	3.8	5.6	7.4	h	1,4	Poor	Good	4.8	3.4	2.7
CARYTOWN SIL	A	2.5	4.0	5.0	6.1	a,b,f	1,4	Fair	Fair	2.6	1.6	1.2
CEDARGAP SIL	A	2.3	3.8	5.4	6.3	d,h	1,4	Good	Good	2.5	1.6	1.2
CEDARGAP CR-SIL, CRL	A	1.6	3.0	3.9	4.8	d,h	1,4	Poor	Fair	4.9	3.4	2.7
CHARITON SIL	A	2.8	4.7	6.2	8.4	a,f	1,4	Fair	Fair	2.4	1.5	1.1
CHEQUEST SICL	A	2.3	4.9	7.6	10.2	f,h	1,4,5	Fair	Fair	0.9	0.6	0.4
CHEROKEE SIL	A	2.8	4.5	6.0	7.4	a,f	1,4	Fair	Fair	2.7	1.7	1.2
CLAIBORNE SIL	B	2.3	4.5	6.7	8.8	c	3	Fair	Fair	2.2	1.4	1.1
CLAIBORNE CR-SIL, SIL	C	2.3	4.5	6.7	8.8	d,h	3	Poor	Fair	2.2	1.4	1.1
CLARINDA SICL	C	2.1	3.9	5.7	7.5	a,f	3,4	Poor	Poor	0.8	0.5	---
CLEORA FSL	A	1.8	3.6	5.3	6.8	d,h	2	Poor	Good	6.0	4.0	2.7
CLEORA LFS	A	1.1	2.7	4.4	5.9	d,h	2	Poor	Good	6.0	4.0	3.0

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Soil Name & Surface Texture	Land Slope*	Cumulative Avail. Water Capacity (in.)				Soil Limits*	Recommendations*	Suitability**		Application Rate (in./hr.)	
		1	2	3	4			Surface Irrig.	Sprinkler Irrig.	Net Application (in.)	0.5
COLAND CL	A	2.5	5.0	7.6	9.6	f,h	1,4,5	Good	Good	2.0	1.4
COLO SIL	A	2.8	5.0	7.3	9.6	f,h	1,4,5	Good	Good	2.5	1.6
COLO SICL	A	2.6	4.9	7.2	9.5	f,h	1,4,5	Good	Good	3.6	2.1
COTTER SIL	A	2.9	5.6	8.1	10.7		5	Good	Good	2.3	1.5
CRAIG CR-SIL	B	1.8	3.3	4.1	4.8			Fair	Fair	2.2	1.4
CRAIG SIL	C	1.9	3.4	4.3	4.9		3	Poor	Fair	2.3	1.3
CRELDON SIL	A,B	2.6	4.3	5.3	5.9	e,f	3,4	Fair	Fair	2.6	1.6
CRIDER SIL	B	2.5	4.9	7.3	8.7		3	Fair	Fair	2.5	1.6
CRIDER SIL	C	2.5	4.9	7.3	8.7		3	Poor	Fair	2.5	1.6
DARWIN SIC	A	1.4	2.9	4.3	5.8	a,f,g,h	1,4	Fair	Poor	---	---
DEEPWATER SICL	B	2.6	5.1	7.4	9.7			Fair	Fair	3.5	2.1
DEEPWATER SIL	B	2.6	5.1	7.4	9.7			Fair	Fair	2.6	1.6
DENNIS SIL	B	2.0	4.1	6.1	8.2	a,f	3	Fair	Fair	2.4	1.5
DOCKERY SICL	A	2.8	5.4	8.0	10.6	f,h	1,4,5	Good	Good	3.5	2.1
DOCKERY SIL	A	2.7	5.4	8.0	10.6	f,h	1,4,5	Good	Good	2.4	1.5
DUPO SIL	A	2.7	5.2	7.4	8.9	a,f,h	1,4	Fair	Fair	2.6	1.6
EDINA SIL	A,B	2.8	4.9	6.3	7.7	a,f	1,3,4	Fair	Fair	2.4	1.5
ELK SIL	A	2.4	4.8	7.2	9.4		5	Good	Good	2.6	1.6
ELSAH SIL	A	2.4	4.2	5.7	6.9	h		Fair	Good	2.5	1.6
ELSAH CR-SIL, CR-L	A	1.6	3.1	4.7	5.8	h		Poor	Fair	7.1	4.5
ERAM CL	B	1.9	3.8	4.9		c,f	3	Fair	Poor	0.8	0.5
EUDORA SIL	B	2.6	5.0	7.3	9.5	h	3,5	Fair	Fair	2.6	1.6
FATIMA SIL	A	2.8	5.3	7.8	10.3	f,h	1,4,5	Good	Good	2.4	1.5
FORNEY SIC	A	1.4	2.9	4.3	5.8	a,f,g,h	1,4	Fair	Poor	---	---

*See opposite page for description.

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LAND SLOPE

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SOIL LIMITATIONS

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Soil Name & Surface Texture	Land Slope*	Cumulative Available Water Capacity (in.)				Soil Limits*	Recommendations*	Suitability**		Maximum Sprinkler Application Rate (in./hr.)	Net Application (in.)
		Water Depths (ft.)	1	2	3	4		Surface Irrig.	Sprinkler Irrig.		
FOURCHE SIL	B	2.6	4.9	6.8	8.0	f	3	Fair	Fair	2.5	1.6
FREEBURG SIL	A	2.8	4.9	7.0	9.2	f,h	1,4,5	Fair	Fair	2.6	1.6
FREEBURG SIL	B	2.8	4.9	7.0	9.2	f,h	3,4,5	Fair	Fair	2.6	1.6
GARA L	C	2.5	4.6	6.6	8.6		3	Poor	Fair	1.3	1.0
GARA CL	C	2.0	4.1	6.1	8.2	e,f	3	Poor	Fair	0.5	0.4
GERALD SIL	A	1.9	2.8	3.1	3.6		1,4	Poor	Poor	2.3	1.5
GIFFORD SIL	B	2.5	4.0	5.4	7.5	a,f	3,4	Fair	Fair	3.7	2.2
GIFFORD SIL	C	2.5	4.0	5.4	7.5	a,f	3,4	Poor	Fair	3.7	2.2
GILLIAM SIL	A	2.6	5.3	7.9	10.6	f	1,3,4,5	Good	Good	2.4	1.5
GLADDEN L	A	2.5	5.0	6.4	6.6	h		Good	Good	2.5	1.6
GLENSTED SIL	B	2.3	4.4	6.4	8.5	a,f	3,4	Fair	Fair	2.4	1.5
GORHAM SIC	A	2.6	4.6	6.5	7.8	f,g,h	1,4	Good	Fair	0.9	0.5
GORIN SIL	B	2.6	4.3	6.0	8.3	a,f	3,4	Fair	Fair	2.5	1.6
GORIN SIL	C	2.6	4.3	6.0	8.3	a,f	3	Poor	Fair	2.5	1.6
GREENTON SIL	B	2.8	4.3	5.7	6.9	a,f	3,4	Fair	Fair	2.4	1.5
GREENTON SICL	C	2.8	4.3	5.7	6.9	a,f	3,4	Fair	Fair	2.4	1.5
GREENTON SICL	C	1.6	3.1	4.5	5.7	a,f	3,4	Poor	Poor	0.9	0.5
GREENTON SICL	B	2.7	4.3	5.7	7.9	a,f	3,4	Fair	Fair	0.9	0.6
GRUNDY SIL	B	2.7	4.3	5.7	6.9	a,f	3,4	Fair	Fair	2.4	1.5
HAIG SIL	A	2.7	4.9	6.5	8.4	a,f	3,4	Fair	Fair	2.3	1.5
HARTVILLE SIL	A,B	2.7	4.7	6.0	7.3	a,f,h	1,3,4	Fair	Fair	2.7	1.7
HARTVILLE SIL	C	2.7	4.7	6.0	7.3	a,f,h	3,4	Poor	Fair	2.7	1.7
HARTWELL SIL	A,B	2.8	4.4	6.4	8.8	a,f	1,3,4	Fair	Fair	0.7	0.4
HATTON SIL	B	2.4	4.2	5.8	7.4	a,f	3	Fair	Fair	2.5	1.6

*See opposite page for description.

**Suitability rating assumes all recommendations are followed.

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SOIL LIMITATIONS

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- b. Highly alkaline subsoil will greatly reduce crop production if exposed. This may limit depth of cut in land leveling.
- c. Limestone or shale within the top 48 inches of the soil profile may interfere with grade and alignment of underground conduits.
- d. Subsoil may contain pockets of sand which may limit depth of cut in land leveling or may give uneven distribution of surface irrigation water.
- e. Fragipan in top 30 inches of the soil profile will limit root development of most crops.
- f. A seasonally high water table may restrict root development of most crops.
- g. The soil surface layer has a tendency to crack prior to irrigation. Net intake is obtained in a relatively short time and very little additional intake occurs after the cracks seal.
- h. An onsite evaluation is needed to determine the frequency and severity of flooding. If flooding is common during the growing season, irrigation suitability will be "Poor" unless protection is provided.

RECOMMENDATIONS

- 1. Land leveling and/or shallow field ditches may be needed to improve surface drainage. Cross-slope drains should be used on gently sloping areas.
- 2. Conservation cropping systems including residue management may be needed to control wind erosion.
- 3. Terraces, conservation tillage, and other conservation practices may be needed to control water erosion.
- 4. See MO-14-10 thru 26 for drainage recommendations and limitations.
- 5. Supplemental irrigation may not be needed during most years.

Soil Name & Surface Texture	Land Slope*	Cumulative Avail.				Soil Limits*	Recommen-dations*	Suitability**		Maximum Sprinkler Application Rate (in./hr.)
		Water Capacity (in.)	Depths (ft.)	1	2	3	4	Surface Irrig.	Sprinkler Irrig.	
HATTON SIL	C	2.4	4.2	5.8	7.4	a,f	3	Poor	Fair	2.5
HAYMOND SIL	A	2.7	5.2	7.7	10.2	h	5	Good	Good	2.6
HAYNIE SIL, SICL	A	2.2	4.3	6.3	8.3	h		Good	Good	2.6
HAYNIE VFSL	A	2.3	4.6	6.8	9.1	h	2,5	Good	Good	2.6
HEPLER SIL	A	2.8	5.5	7.9	9.7	f,h	1,4,5	Good	Good	2.7
HIGGINSVILLE SICL	C	2.5	4.5	6.5	8.4	a,f	3,4	Poor	Fair	3.7
HIGGINSVILLE SIL	C	2.5	4.5	6.5	8.4	a,f	3,4	Poor	Fair	2.3
HILDEBRECHT SIL	A	2.4	4.7	5.8	6.3	e,f	3,4	Fair	Fair	2.5
HGBERG L, SIL	B,C	1.8	2.8	3.1	3.9	e,f	3,4	Poor	Poor	2.1
HOBSON L	B	2.1	3.5	4.6	5.6	e,f	3,4	Fair	Fair	2.1
HOBSON L	C	2.1	3.5	4.6	5.6	e,f	3,4	Poor	Fair	2.1
HODGE FS, LFS	B	1.0	2.0	2.9	3.9	d,h	2,3	Poor	Poor	20.3
HOLSTEIN L	C	2.3	4.3	6.2	8.1		3	Poor	Fair	2.6
HUMESTON SIL	A	2.6	5.2	6.9	8.5	a,f	1,4	Fair	Fair	3.0
HUNTINGTON SIL	A	2.4	4.8	7.1	9.3	h	5	Good	Good	2.6
IDA SIL	B	2.5	5.0	7.6	10.1		3,5	Fair	Fair	2.7
JONCA SICL	B	2.3	4.2	5.4	5.8	e,f	3,4	Fair	Poor	0.7
JONCA SIL	B	2.3	4.2	5.4	5.8	e,f	3,4	Fair	Fair	2.7
JUDSON SICL, SIL	A	2.6	5.3	7.9	10.6		5	Good	Good	3.6
KARNAK SIC	A	1.4	2.7	4.0	5.3	a,f,g,h	1,4	Fair	Poor	0.2
KEENO CR-SIL	C	1.2	2.1	2.7	3.1	e,f	3,4	Poor	Poor	6.8
KEG SIL	A	2.6	5.3	7.8	10.3	h	5	Good	Good	2.6
KENMOOR LFS	A	1.1	2.1	3.6	5.4	f,h	2	Poor	Fair	8.9
KENNEBEC SIL	A	2.8	5.5	8.3	10.9	h	5	Good	Good	2.4

*See opposite page for description.

**Suitability rating assumes all recommendations are followed.

LAND SLOPE

A:	(0.2%)
B:	(2-5%)
C:	(5-9%)

SOIL LIMITATIONS

- a. A clayey subsoil layer with slow or very slow permeability restricts the downward movement of water within the root zone of most plants.
 - b. Highly alkaline subsoil will greatly reduce crop production if exposed. This may limit depth of cut in land leveling.
 - c. Limestone or shale within the top 48 inches of the soil profile may interfere with grade and alignment of underground conduits.
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RECOMMENDATIONS

1. Land leveling and/or shallow field ditches may be needed to improve surface drainage. Cross-slope drains should be used on gently sloping areas.
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 5. Supplemental irrigation may not be needed during most years.

Soil Name & Surface Texture	Land Slope*	Cumulative Available Water Capacity (in.)				Soil Limits*	Recommendations*	Suitability**		Maximum Sprinkler Application Rate (in./hr.)		
		1	2	3	4			Surface Irrig.	Sprinkler Irrig.	Net Application (in.)	0.5	1.0
KENOMA SIL	A, B	2.2	3.7	5.8	8.1	a	1,3	Fair	Poor	0.6	0.4	---
KESWICK L	B	1.9	3.5	5.1	6.7	a, f	3	Fair	Fair	2.2	1.4	1.0
KESWICK CL	C	1.6	3.1	4.7	6.4	a, f	3	Poor	Poor	0.6	0.4	0.2
KESWICK SIL, L	C	1.9	3.5	5.1	6.7	a, f	3	Poor	Fair	2.2	1.4	1.0
KICKAPOO FSL	A	1.7	3.4	5.1	6.8	h	2	Good	Good	1.8	1.2	0.9
KILWINNING SIL	B	2.3	3.8	5.6	7.9	a, f	3,4	Fair	Poor	2.4	1.5	0.8
LADOGA SIL	B	2.7	5.0	7.2	9.5		3,5	Fair	Fair	2.4	1.5	1.1
LADOGA SIL, SICL	C	2.7	5.0	7.2	9.5		3,5	Poor	Fair	2.4	1.5	1.1
LAGONDA SIL	B	2.5	4.3	6.1	7.7	a, f	3,4	Fair	Fair	2.3	1.5	1.0
LAGONDA SICL	C	2.2	4.0	5.8	7.4	a, f	3,4	Poor	Fair	0.9	0.6	0.4
LAMONI CL, L, SIL	C	2.3	4.3	6.1	7.9	a, f	3,4	Poor	Poor	0.6	0.4	0.2
LAMOTTE SIL, L	C	2.4	4.5	6.6	8.4		3	Poor	Fair	2.8	1.7	1.2
LANTON SICL, SIL	A	2.4	4.6	6.9	8.8	f, h	1,4	Fair	Fair	2.2	1.4	0.6
LEBANON SIL	B	2.2	3.8	4.5	5.5	e, f	3,4	Fair	Fair	2.6	1.6	1.1
LEBANON SIL	C	2.2	3.8	4.5	5.5	e, f	3,4	Poor	Fair	2.6	1.6	1.0
LEBANON CR-SIL	C	1.6	3.2	3.9	5.2	e, f	3,4	Poor	Fair	2.6	1.6	1.1
LEONARD SIL	C	2.2	3.5	4.9	6.3	a, f	3,4	Poor	Poor	1.1	0.6	0.2
LESLIE SIL	B	2.8	5.0	6.6	8.1	a, f	3,4	Fair	Fair	0.7	0.5	0.3
LESLIE SIL	C	2.8	5.0	6.6	8.1	a, f	3,4	Poor	Fair	0.7	0.5	0.3
LESLIE SIL	C	2.8	5.0	6.6	8.1	a, f	3,4	Poor	Fair	0.7	0.5	0.3
LETA SIC	A	1.6	3.4	5.6	7.7	a, f, g, h	1,4	Fair	Poor	0.2	0.1	0.1
LETA SICL	A	1.6	3.4	5.6	7.7	a, f, g, h	1,4	Fair	Poor	1.0	0.6	0.2
LEVASY SIC, SICL	A	1.3	2.6	4.6	6.5	f, g, h	1,4	Fair	Poor	0.2	0.1	0.1
LIBERAL SIL	B	2.5	4.2	5.4	6.6	a, c, f	3	Fair	Fair	2.3	1.5	0.6
LIBERAL SICL	C	2.5	4.2	5.4	6.6	a, c, f	3	Poor	Fair	2.3	1.5	0.6

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